

## STATUS OF THE OIL AND GAS SECTOR

This review of the Oil and Gas sector examines projects intended to rebuild Iraq's oil and natural gas wells, pipelines, and refineries. Projects in the Oil and Gas sector contribute to crude oil production, processing, gas and oil separation plants, and distribution. U.S.-funded activities in the Oil and Gas sector have primarily been limited to the rehabilitation, repair, and expansion of existing facilities.<sup>24</sup> Rehabilitated oil projects accounted for approximately 75% of oil production in Iraq, as of November 30, 2005.<sup>25</sup> However, less than half of the allocated funds have been expended, and less than a quarter of the planned projects have been completed.

This section measures progress in the Oil and Gas sector by reviewing capacity, production, and exports. *Capacity* is the potential output in the Oil and Gas sector if production is at 100% efficiency. The U.S. reconstruction

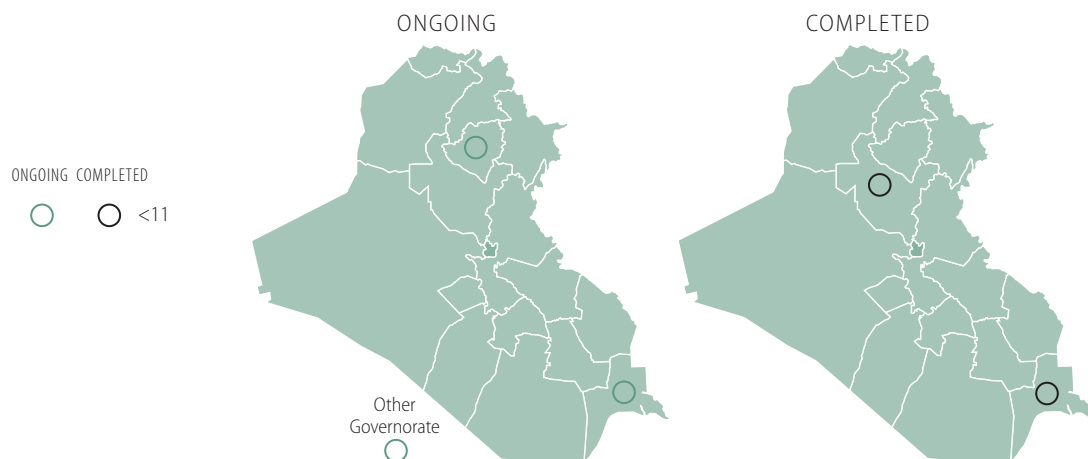
program has significantly increased the output potential of the Oil and Gas sector. GRD-PCO reports that Iraq has the capacity to produce 2.5 million barrels per day (MBPD) of crude oil, which is the same capacity it had before the war. *Production* is the actual per day output in the Oil and Gas sector. The rough average for crude production output during the quarter was 2.0 MBPD, according to DoS *Iraq Weekly Status* reports. *Exports* measure how much of Iraq's oil production actually makes it to the foreign markets.

The potential for return on investment has been one of the key factors for project prioritization. GRD-PCO officials estimate that every dollar invested in the oil infrastructure is expected to yield a recurring annual return of five dollars. Efforts have focused on the reconstruction or refurbishment of facilities in the two primary areas of oil production: Kirkuk in

Figures 2-7

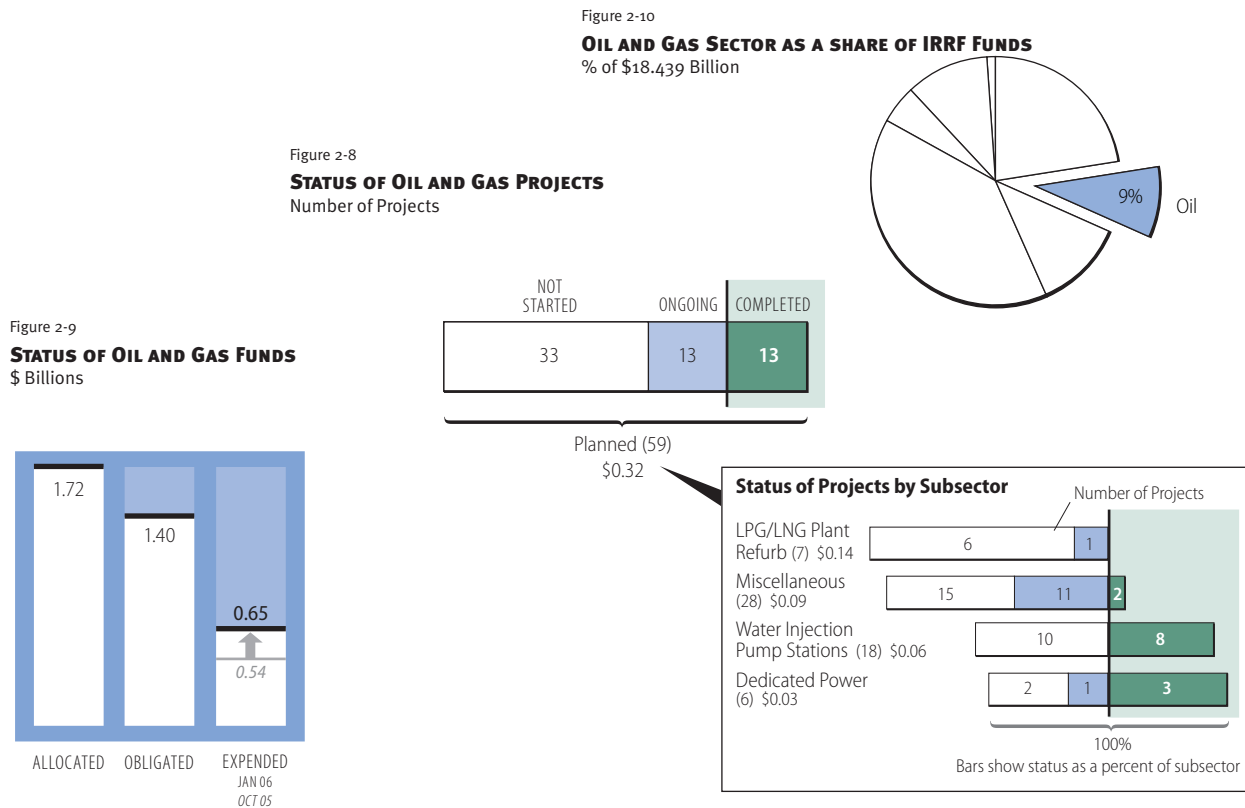
### OIL AND GAS PROJECTS BY GOVERNORATE

Number as of January 1, 2006



## STATUS OF OIL AND GAS SECTOR

AS OF DECEMBER 31, 2005



the north and Basrah in the south.

Figure 2-7 shows the location of completed and ongoing projects.

### IRRF-funded Activities in the Oil and Gas Sector

Of the 136 Oil and Gas projects, 67 are Engineering and Procurement (EP) projects, and 69 are Engineering, Procurement, and Construction (EPC) projects. Of the 69 EPC projects, 10 are reported to be administration projects, and 59 are construction projects. In this report, SIGIR includes supporting data for the 59 EPC projects shown in Figure 2-8.

Almost half of the 59 planned EPC projects have been initiated, and 22% have been completed, according to the Department of Defense (DoD) data. During the past quarter, two projects were completed, five were started, and one was slated to begin on December 31, 2005. Despite schedule delays and an apparent lag in the project completion rate, GRD-PCO expects that this rate will increase as long-term projects draw closer to completion. The pace of work on these projects should also increase significantly as the Iraqi role continues to expand. Figure 2-8 shows the status of projects in the Oil and Gas sector.

Despite progress in Iraq on many important ongoing projects, less than half of the sector's allocated funds have been expended. Figure 2-9 shows the status of funding for the Oil and Gas sector.

### KEY PROJECTS COMPLETED AND UNDERWAY

During this reporting period, several important oil projects made substantial progress. One of the most important, the *Al Fatah Pipeline River and Canal Crossing Project* in the Tameem governorate, is now roughly 72% complete, with an estimated termination date of March 1, 2006.<sup>26</sup> This facility is a key transfer point in moving crude oil from northern fields to local refineries and then to export. When complete, the project is expected to provide at least an additional 300,000 barrels per day (BPD) through the Iraq-Turkey Pipeline for export via the port of Ceyhan.<sup>27</sup> *Al Fatah* currently has working temporary lines installed, as well as an additional operating oil line under the river. Included in this Quarterly Report is a project assessment of *Al Fatah*. The assessment reports on the original planning and implementation of the project, as well as some of the challenges it initially faced.

The *Qarmat Ali* water injection system and treatment plant project in southern Iraq is another important initiative that made good progress during the quarter. As of the middle of December, the plant was 70% complete, and the next phase of work is slated to increase injection capacity to 100% of goal. The initiative aims to boost oil production by as much

as 200,000 BPD.<sup>28</sup> This project will improve oil extraction at more efficient rates and thus will boost production levels.

On October 6, 2005, repairs began on the *Al Basrah Oil Terminal (ABOT)*. Slated for completion on December 31, 2006, the *ABOT* Task Order was approximately 31% complete as of late December 2005. It comprises 13 individual projects, the first of which is currently 61% complete. The scope of the project is to refurbish three hydraulic control units for loading arms and to replace one damaged unit, giving the facility the capability to load four cargo ships at once.<sup>29</sup>

The *ABOT* facility is an important project for improving Iraqi export capabilities in the south. GRD-PCO officials noted that the usefulness of the repaired *ABOT* will still be limited by inadequate on-shore pipeline and pumping capabilities. They also state that the primary benefit of *ABOT* is the implementation of a new metering system for exports that will help prevent theft and reduce corruption. This metering system also meets a key requirement for Iraqi debt management milestones.

### FUNDING FOR THE SECTOR REMAINS MOSTLY CONSTANT

In November 2003, Congress allocated \$1.89 billion for reconstruction projects in Iraq's Oil and Gas sector. Most of these funds (\$1.2 billion) were allocated to infrastructure reconstruction; the remainder (about \$690 million) was used to purchase emergency supplies of refined petroleum products. As a result of

subsequent allocation changes—primarily from the IRRF Strategic Spending Review in 2004—funding for infrastructure development jumped to \$1.697 billion, and funding for emergency refined stocks decreased to \$26 million.<sup>30</sup> The current allocation to the Oil and Gas sector is \$1.72 billion.

In 2004, CPA estimated that \$8 billion would be required to adequately meet the needs for reconstructing the Oil and Gas sector.<sup>31</sup> U.S. officials have consistently maintained that the purpose of the reconstruction program is to get the reconstruction effort moving. It was always assumed that international donors and Iraqi oil exports would provide sufficient additional financing for the remainder of the effort. Figure 2-10 shows IRRF allocation for the sector.

## Outputs of IRRF-funded Projects

There are at least two ways to measure progress in reconstructing the Oil and Gas sector, and output goals in this sector abound. One method is to focus on production capacity, which measures how many units of energy the country as a whole is capable of producing on a daily basis. The other is a simple measurement of current production per day. Table 2-3 focuses on current Iraqi production capacity goals. This information, from GRD-PCO, provides insight into how production capacity is progressing, but it does not offer a clear picture of current production. Table 2-4 focuses on actual production and U.S. reconstruction goals, using measurement information from U.S. Embassy-Baghdad. According to the report, rehabilitated oil projects accounted for approximately 75% of oil production, as of November 30, 2005.

### PETROLEUM PRODUCT PRODUCTION RATES AND GOALS

OBJECTIVE	CURRENT	IRAQI GOVERNMENT END-STATE GOAL (DECEMBER 2006)	REMAINS TO BE ACHIEVED
Crude Oil Production Capacity (MBPD)	2.5	3.0	0.5
Crude Oil Exports (Actual) <sup>a</sup> (MBPD)	1.7	2.4	0.7
Natural Gas Production (MSCFD) <sup>b</sup>	600	800	200
Liquefied Petroleum Gas (LPG) Production (TPD) <sup>c</sup>	1,200	3,000	1,800

<sup>a</sup> PCO reports 1.7 MBPD in its Oil and Gas Sector History, but the average for the quarter according to figures in the DoS *Iraq Weekly Status* report is about 1.16 MBPD.

<sup>b</sup> MSCFD = million standard cubic feet per day

<sup>c</sup> TPD = tons per day

Source: GRD-PCO Sector History for the Oil and Gas sector, received on January 13, 2006.

TABLE 2-3

## ACTUAL OIL SECTOR PRODUCTION VS. U.S. RECONSTRUCTION GOALS AS OF NOVEMBER 30, 2005

END-STATE METRIC	PRE-WAR LEVEL (2003)	POST-WAR LEVEL (2003)	U.S. END-STATE GOAL	IRAQI GOVERNMENT END-STATE GOAL (TEN-YEAR)	CURRENT STATUS <sup>f</sup>
Crude Oil Production Capacity <sup>a</sup> (MBPD)	2.6	0.6	3.0	6.0 <sup>b</sup>	2.6
Crude Oil Production (MBPD)	2.6	0.6	2.8 U.S. Contribution: 1.9	6.0	2.1 U.S. Contribution: 1.5
Exported <sup>a</sup>	2.0	-	2.2	5.0	1.6
Natural Gas Utilization (MSCFD) <sup>c</sup>	850	200	800 U.S. Contribution: 600	5,000	600 U.S. Contribution: 400
Liquefied Petroleum Gas <sup>d</sup> Production (TPD) <sup>e</sup>	5,000	1,200	3000 U.S. Contribution: 1800	6,000	1,700 U.S. Contribution: 500

<sup>a</sup> U.S. Embassy-Baghdad reports different capacity numbers than GRD-PCO, probably due to the date difference.

<sup>b</sup> 6.0 MBPD is also the crude production capacity goal set forth in the Iraqi National Development Strategy, June 30, 2005.

<sup>c</sup> MSCFD = million standard cubic feet per day

<sup>d</sup> Critical refined fuels are measured in a metric amount (as are these), or in days of supply. The text focuses on days of supply to use more stable numbers.

<sup>e</sup> TPD = tons per day

<sup>f</sup> According to the IRMO Senior Consultant to the Ministry of Oil, the methodology for determining the U.S. contribution to overall production levels was to subtract post-war production (about 600,000 BPD were attributed to Iraqi restoration efforts) from the production level as of November 30, 2005 (2.1 MBPD), thus resulting in a total U.S. contribution of 1.5 MBPD.

Source: DoS Briefing by U.S. Embassy-Baghdad Oil Metrics, November 30, 2005.

TABLE 2-4

The unsurprising fact revealed in these tables is that production capacity has improved as the reconstruction effort has picked up momentum. The end-state goal is 3.0 MBPD in production capacity, which will exceed the pre-war production rate.

Although U.S.-funded projects are having a positive effect on output in the Oil and Gas sector, it remains difficult to meet the pre-war production level goals that CPA first set in October 2003. Security problems primarily account for the shortfall. The continued flat oil production rate is a point of particular concern because oil must fuel the engine of Iraq's economic growth.

### Outcomes

Oil exports account for more than 95% of Iraq's national income. Iraq's highest production peak was in December 1979, when the country produced 3.7 MBPD. Much of its infrastructure and production capacity never

fully recovered from the damage suffered in the Iran-Iraq and Persian Gulf Wars.<sup>32</sup> Iraq was producing approximately 2.5 MBPD from 1999 to 2001 and peaked at around 2.58 MBPD in January 2003.<sup>33</sup> The current Ministry of Oil goal for oil production is 2.5 MBPD, and the maximum consumption target for each of the four refined petroleum products is a 15-day supply.<sup>34</sup> As Figure 2-11 shows, crude oil production has hovered around 2.0 MBPD for most of this reporting period.<sup>35</sup>

A variety of problems have hindered exports of oil, which have remained much lower than expected, declining to about 1.1 MBPD in December.<sup>36</sup> For example, in late December 2005, threats against oil tanker operators and refinery workers at the Baiji refinery led many to refuse to work, effectively shutting down the facility. The good news for Iraq's oil export industry, however, is that high oil prices continue. Oil exports in 2005 earned almost \$23 billion—up from approximately \$17 billion in

Figure 2-11  
**CRUDE OIL PRODUCTION**

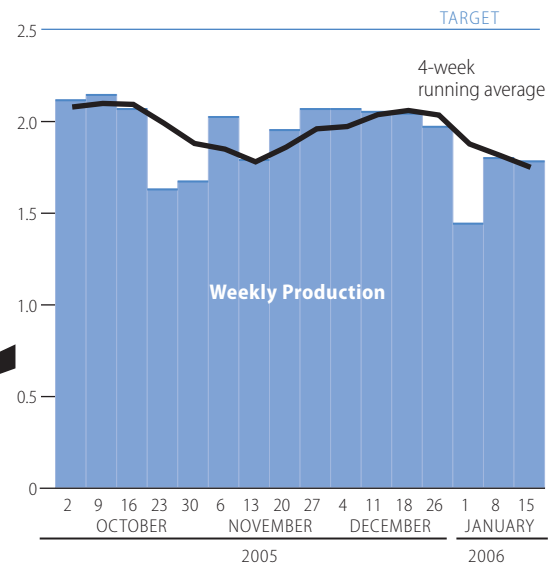
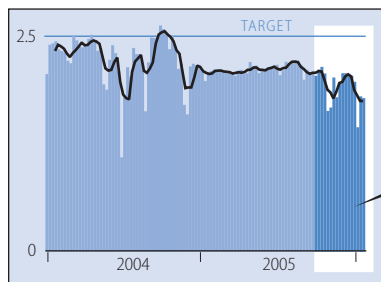
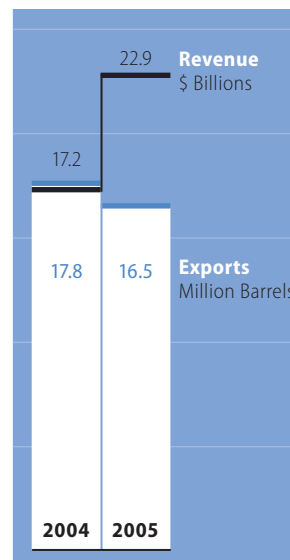
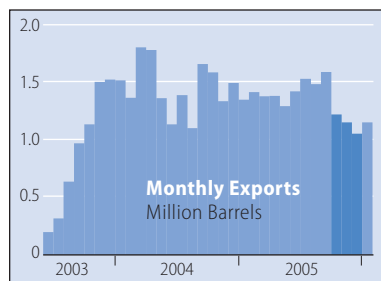


Figure 2-12  
**CRUDE OIL EXPORTS**



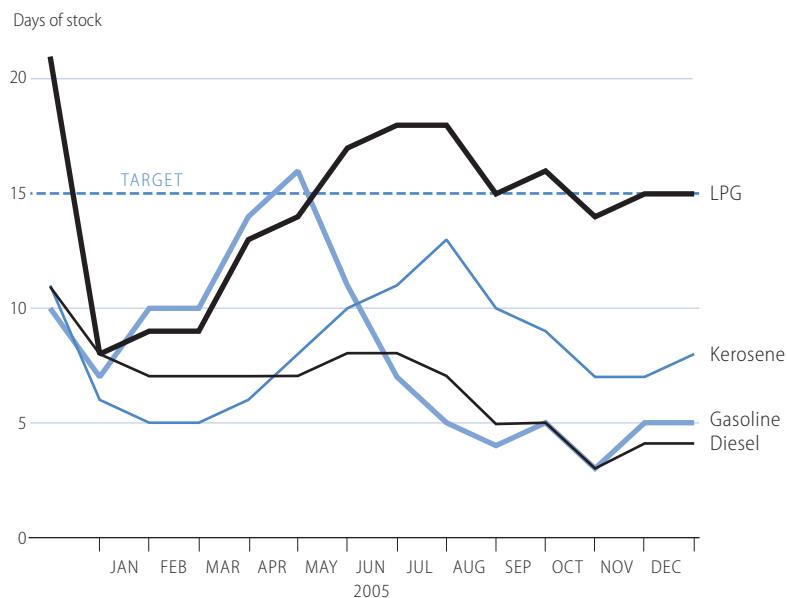


Figure 2-13  
**REFINED FUEL  
STOCK LEVELS**

2004, as Figure 2-12 demonstrates.

Reaching production targets for critical refined fuels has also been a problem. Only liquefied petroleum gas (LPG) reached its target; diesel, kerosene, and gasoline have all lagged behind.<sup>37</sup> Figure 2-13 shows the stock levels for Iraq's refined fuels. Many of these supplies are imported into Iraq, costing approximately \$200-250 million per month<sup>38</sup> while the government struggles to consolidate and sustain improved production and export levels. Fuel supplies are further strained when Iraq fails to pay exporters on time, which is likely to happen more often if the economy does not recover soon.

### FUEL SUBSIDIES

Fuel subsidies kept prices abnormally low, thus encouraging unrestrained demand and a black market in smuggled fuel, which combined to further diminish the supplies of critical refined fuels. Direct and indirect subsidies also cost the Iraqi economy an estimated \$8 billion per year, according to the U.S. Department of Energy.<sup>39</sup> In late December 2005, the International Monetary Fund (IMF) approved

a Stand-By Arrangement for Iraq, which provides \$685 million to support the Iraqi economic program over the next 15 months.<sup>40</sup> One critical aspect of this arrangement is that the Iraqi government must reduce fuel subsidies, price distortions, smuggling, and corruption.<sup>41</sup> Measures taken by the Iraqi government to address the subsidy issue since late December 2005 should help mitigate high fuel demand, smuggling, and corruption concerns, but the subsequent riot in Kirkuk and the temporary upheaval in the Ministry of Oil suggest that the issue is not yet fully resolved.

For the most part, reconstruction levels for the Oil and Gas sector have not reached target levels since October 2004, and some industry experts question whether the sector has the capacity to do so in a sustainable manner. For instance, one recent commodities industry report suggests that investment dollars are being distributed too slowly and to the wrong projects.<sup>42</sup> The October constitutional referendum and the December election of a new Iraqi government, however, indicate that Iraq is moving toward a greater degree of coherence, and therefore will be better prepared to execute reconstruction priorities going forward.

## Challenges

Three challenges have been associated with slow project start and funding expenditure rates: security, sustainment, and the deteriorated infrastructure.

### SECURITY

Security threats against the oil and gas infrastructure take many forms, ranging from the illicit acts of individual looters to the organized activities of complex crime syndicates. Although criminal threats such as these remain a serious concern for the integrity and security of Iraq's oil infrastructure, no threat has been more debilitating than the incessant insurgent attacks. According to one study cited by the U.S. Department of Energy, there have been close to 300 attacks on Iraq's energy infrastructure since June 2003. These attacks have cost Iraq billions of dollars in infrastructure repairs and lost revenues,<sup>43</sup> as well as slowing the pace of reconstruction.

Insurgent attacks have clearly taken a heavy toll on the Oil and Gas sector in the north. For example, nearly continuous attacks on the Iraq-Turkey Pipeline have significantly reduced its capacity to generate sustained export revenues. Iraqi workers have also been targeted for attacks, especially when working at reconstruction sites. In early January 2006, for example, insurgents attacked a convoy of approximately 60 oil transport vehicles from the Baiji facility; about one-third of the

vehicles were reportedly destroyed or disabled.

According to GRD-PCO, the economic importance attributed to developing the Oil and Gas sector serves as a potential "single point of failure" that will require diligent application of security and military forces to protect the oil and gas infrastructure from further attacks. The Iraqi military is currently meeting the threat through increased security and field activities, supplemented by coalition forces.<sup>44</sup>

### SUSTAINMENT

Sustainability continues to be an important factor in explaining the lack of significant progress in Oil and Gas sector reconstruction. In October 2005, a SIGIR audit found that sustainment among Iraqi workers remains a crucial requirement for the successful reconstruction of the sector. The audit estimated that approximately \$178 million would be required for Oil and Gas sector sustainment in 2006-2007.<sup>45</sup> The preparedness of Iraqi workers to operate and maintain modern technology in producing and refining oil is still as important in the reconstruction process as preventing insurgent attempts to destroy that equipment.

Crude re-injection continues to cause concern. Iraqis use this technique to return excess pumped crude oil back into the ground—mostly because they lack sufficient storage and export capacity to handle the volume of crude oil currently being pumped. Unfortunately, crude oil re-injection increases oil viscosity, making it more difficult and costly to extract



oil. The viscosity problem has already occurred at Kirkuk, and may have permanently damaged the fields.<sup>46</sup>

Although outputs generated by U.S.-funded projects provide a significant improvement in this sector, oil production levels still have not reached the stated target. This is due in no small part to sustainment issues related to O&M and capacity development. O&M is a particular concern for southern export and pumping stations. U.S. agencies and officials recognize the importance of this issue: both GRD-PCO and IRMO are working on initiatives to mitigate the risks to project sustainment in the reconstruction process.

More than a year ago, PCO joined IRMO and other U.S. agencies to begin working toward sustainability of U.S.-built facilities through a process called Capacity Development (CD). CD is one of the basic tools used to transfer knowledge, skills, and abilities to Iraqi workers at various infrastructure facilities. As a result, U.S. activities have helped to provide 300,000 hours of Oil and Gas sector training, operational testing and commissioning, and spare parts.<sup>47</sup>

### **INFERIOR QUALITY OF INFRASTRUCTURE HARDWARE**

In the pre-war period, U.S. planning officials and energy experts underestimated the extent to which Iraq's oil infrastructure was degraded, as is highlighted by the testimony of a Kellogg Brown and Root, Inc. (KBR) official:

*Once our engineers began work, they found that many oil facilities were in complete disrepair due to decades of neglect, as well as recent looting and sabotage. Many pipelines in the south were damaged during battles. Wellheads were rigged with explosives, some of which were triggered, causing greater damage and again creating significant risk for our employees... We found that the Iraqi oil equipment was old, neglected and often desperately in need of repair.<sup>48</sup>*

*Alfred V. Neffgen—Chief Operating  
Officer of the KBR Government  
Operations unit—testifying before Congress*

Most of the infrastructure consisted of antiquated technology that was no longer available, which forced contractors to overhaul entire structures. Post-conflict looting and sabotage aggravated the integrity of the sector's infrastructure. Government assessments as of June 2003 stated that more than \$900 million would be needed just to replace looted oil equipment, and this assumed a peace-time reconstruction environment.<sup>49</sup>

The capacity of the current infrastructure raises an additional problem for the Oil and Gas sector. For example, the lack of significant storage capacity for fuel in Iraq has caused shutdowns, leading to delays, revenue losses, and workers employing harmful techniques, such as fuel re-injection. Also, field decline is a particular problem in the southern oil fields, which currently account for a large majority of Iraq's oil production because insurgents have consistently targeted the northern oil pipelines.